21 April 1967

Dr. H. Orin Halvorson
Department of Biochemistry
University of Minnesota
St. Paul, Minnesota 55101

Dear Dr. Halvorson:

Attached are the rewrites which you requested at the last panel meeting. The first is a recommendation on the man/machine interface area which I have checked with Dr. Goldman. Both Dr. Goldman and I believe that the section should be called man/machine interaction rather than man/machine interface. The second is a shorter version of my report on the selective service with a recommendation which is underlined at the end. The third is a modified contribution to the civil defense report which may be included with Dr. Housewright's contribution. Although I was not specifically asked to make a recommendation, I have underlined a section which might be included if a recommendation seems warranted.

I am looking forward to meeting with the panel on 19 May.

Yours truly,

[redacted]

ST

Attachments (3)

AT [redacted]

RECOMMENDATIONS ON THE MAN/MACHINE INTERACTION

The design and development of modern military weapons systems has given inadequate consideration to man's ability to control them. The panel recommends that a greater and sustained effort be undertaken to study the interaction between these systems and the men who are to operate them. Particular emphasis should be given to the biological hazards which could result from radiant and other forms of energy produced by these systems and from the many stresses acting individually and in combination in an operational environment.

II. MENTAL AND PHYSICAL DEFECTS AND DISEASE PROBLEMS

a. Manpower Availability Through the Selective Service

There is a massive pool of facts and figures available on rejection rates for selective service. Much of this data cannot be directly compared. The reasons are basically because the standards for acceptance vary depending upon the complexity of the machinery of war and manpower requirements. Standards become less stringent when large numbers of soldiers are required as was the case in 1942 to 1944 in World War II. Nevertheless, there are some rather interesting trends which have been noticed and reported. Much of this data has been analyzed by Bernard D. Karpinos of the Medical Statistics Agency, Office of the Surgeon General, Department of the Army, and by the Selective Service.

Some interesting data is presented in Medical Statistics Bulletin No. 1 which might be useful in comparing the situation in 1941 with current rejection rates. During the period of 1940 to May 31, 1941, approximately two million draftees were examined by local boards. Of this two million, approximately one million were rejected for general duty; however, an additional 500,000 were acceptable to the armed forces on a limited basis. Hence, an overall rejection rate of approximately 25%. Of the one million rejected for general military service, 900,000 (90%) were rejected due to physical and mental disease. Only 100,000 (10%) were rejected because of the lack of educational or mental qualifications.

A sample of two million draftees, the sample size being about 20,000, shows an interesting breakdown of the reasons for disqualification. The major causes for rejection were defects of the teeth accounting for 20.9%; defects of the eyes accounted for 13.7%; cardiovascular system defects, 10.6%. Mental and nervous diseases ranked sixth on the list of causes for rejection with a percentage of 6.3.

Additional information in Medical Statistics Bulletin No. 2, August 1, 1943, provides data from the period November 1940 to September 1941 by which time three million registrants had been examined by local boards and eventually at induction stations. The overall rejection rate was about 52.8%, not unlike the current rejection rate. At this point, however, it is well to point out that the draftees ranged up to 35 years of age and were to some extent a pre-selected sample since presumably some of the healthier specimens were not brought into the service through the selective service system but volunteered for duty. Using this somewhat larger group, 16.5% of the rejections were now caused by dental defects; mental and nervous defects accounted for approximately 10.5% and now moved into third place as a cause for rejection. The Negro rejection rate based on these three million registrants showed a rejection rate of 51.9%, which is in marked contrast to the current situation.

The next comparable period of study was reported in Medical Statistics Bulletin No. 3, from April 1942 to December 1943. This data is based upon a 20% sample of approximately nine million men

examined. The rejection rate varied month by month from a low of 31.4% in January 1943 to 46.9% for December 1943. White rates were consistently lower than Negro rates throughout the entire period. The lowest Negro monthly rejection rate was 51.2% while the highest for whites was 42.9%. These differences held for each age group. Rejections increased in direct relation to age from the middle thirties on, reaching over 50% of all registrants examined. Higher rejection rates were found in the south while the lowest rates were found in the northwest. During this period, mental disease was the major cause of rejection ranging from 12.5% to 17.9%. Mental deficiency was second in importance ranging from 10.7% to 14.2%. Rejection on the basis of mental deficiency was considerably higher among the Negroes than rejection for mental disease, whereas the reverse was the case amongh the whites during this period.

Medical Statistics Bulletin No. 4 covers the period January 1944 to August 1945. During this time, approximately 5,700,000 registrants had been examined, of which about 44% were rejected for general military service. Again the leading causes for all rejections were mental disease, 26.8%; failure to meet the mental standards, 12.8%; musculoskeletal defects; and cardiovascular defects.

Another study was made of the qualifications of Americans used for military service for the period of July 1950 through June 1960. This was broken into three periods: the so-called Korean War period July 1950 through July 1953; a second period of August 1953 to July 1958; and

the third period from August 1958 to June 1960. Although the overall disqualification rate increased from 34% in the first period to 40.4% in the second period and 51.2% in the third period, a comparison shows that only 16.2% of the draftees were rejected for mental reasons during the third period. It is interesting to note that although some 5.5% of individuals examined for military service during the entire World War II were disqualified because of psychiatric conditions, the disqualification rate for psychiatric reasons during this later period is around 2% due to a modification of standards. The rejection rate for failure to meet the mental test continues to rise. This is in part due to more stringent mental requirements added to the military testing program in 1958.

During the period 1964 to 1965, approximately two million draftees were forwarded to the armed forces examining and induction stations for pre-induction examination. Somewhat less than half a million of these examinees were disqualified for medical reasons, and almost the same number failed to pass the mental test. The vast bulk of these draftees were approximately twenty years of age. This is a rather frightening statistic. On a percentage basis, 23.4% of the total number failed to meet the current mental requirements; 21.4% failed the mental tests only; and 2% failed the mental test and were also disqualified for medical reasons. Of the non-Negro draftees, 15% failed the mental test on a nationwide basis. Of the Negro draftees, 63.3% were disqualified on the basis of mental examination. Thus, the disqualification rate

for the Negro draftees was approximately four times as high as for the white draftees. For comparison, it should be noted that the overwhelming cause for rejection during World Wars I and II was for physical defects alone.

There are also geographic differences which range from a rejection rate of 14.4% in the north central region of the country to 36.5% in the south. Even greater differences were found in particular states. For example, the rejection rate in Iowa on the basis of the mental test was 6.4% whereas the rejection rate in Mississippi was 59.7%.

A variety of tests have been used over the past twenty years to measure the mental requirements acceptable for military service. During the past few years, variations of the Armed Forces Qualification Test has been used by all services. The AFQT has a dual function: "a. To differentiate the examinees who can effectively acquire military skill from those who cannot - in order to eliminate the latter group, and b. To provide a general index of the potential usefulness for military service of those who qualified for military service, commensurate with their mental ability." A number of correlations were made to attempt to relate the AFQT scores with educational attainment. If one compares the median scores on an ethnic basis alone, there seems to be no significant difference with respect to educational attainment. However, if one considers the data on the basis of geographic and ethnically differentiated groups, there is a very marked difference. In summary, it appears as though the determining factors on mental rejection are not only

related to the level of formal education and its quality but to interrelated socio-economic factors outside the school.

It is clear that the overall rejection rate depends to a large extent on manpower demands; hence, 75% of all draftees in World War II were available for some form of duty. From the period following World War II to the present, the overall rejection rate tends to remain fairly constant at about the 50% level. Both mental and physical standards have been raised and lowered according to manpower requirements. The proportion of rejectees for mental disease as distinct from education and mental level has decreased due to a change in the standards since World War II. Perhaps the most salient statistics are these: since 1950 and through June 1966, about 35% of white examinees were disqualified whereas 64% of the Negroes examined were disqualified. The disqualification rate for Negro examinees is 80% higher than for white examinees. The primary difference in these disqualification rates by race are due to mental test failures. Indeed, disqualification for medical reasons alone shows a lower rate among the Negroes than among white examinees. The disqualification rate for mental test failures among Negro examinees was four times as high as among white examinees. While one out of seven white draftees failed the mental test, about three out of five Negro draftees failed, quite a disturbing cultural and socio-economic phenomenon.

Analysis of the causes of rejection for purely medical reasons,

shows that there is really very little that can be recommended. Causes for medical rejection generally reflect the major health problems extant in the general population. However, there is an alarming rate of rejection on the basis of mental tests. This is surely not a matter for national defense alone but is a factor in the overwhelming need for improved education, particularly in the socio-economically depressed areas. Statistical data since World War II suggests that the relative rate of rejection for failure to meet the mental standards will continue to increase, probably in direct relation to the complexity of modern warfare.

Recommendation. There is a relative decrease in manpower available to the armed services since World War II. Of greater significance is the rapid increase in rejection on the basis of mental tests. The panel endorses current national efforts to improve educational opportunities, particularly in depressed socio-economic areas, and underlines the importance of these programs to national defense manpower needs.

V. CIVIL DEFENSE

The current medical civil defense effort is based upon a number of assumptions which include the unavailability of hardened shelters. As a result, only limited fallout protection will be available in the event of a massive attack. Analysis of the availability of physician survivors of an attack as well as available hospital facilities indicate that the rate of survivors will be dependent more on the availability of trained manpower than on any other single factor. Trained medical personnel, however, will be of little use without adequate supplies and equipment properly distributed. Some provision has been made for the stockpiling of hospitals, equipment and supplies. In any case, however, these supplies need to be renewed and relocated and expanded to provide a thirty-day supply of equipment, drugs, and the like. In spite of the relatively pessimistic view taken by many, it would appear that adequate supplies and equipment, if properly located, could save millions of lives in a nuclear attack.

It would seem prudent to increase the number of personnel who could provide some form of medical assistance during the post attack period. Various civil defense agencies at the federal and local levels have undertaken a number of training programs for the civilian population. Indeed, approximately two million people are now receiving some form of civil defense training. Nevertheless, it is quite clear that the civilian population, either due to apathy or other reasons, have not

chosen to take advantage of civil defense training. Experience to date would indicate that simply augmenting the number of courses available on a voluntary basis is not likely to increase the number of trained civilians. It is unlikely that some form of compulsory training would be acceptable to the population at large unless such a program was integrated into current educational programs.

The availability of food, water, and sewage disposal are of great importance with respect to post attack survival. The Department of Agriculture and a number of other agencies have been given responsibilities in terms of civil defense. With respect to food, the Department of Agriculture has set up an extensive program at the federal, state, and local levels. Personnel who make up this organization are equipped and trained to carry out radiological monitoring, food inspection, water inspection, and to assist the local population in obtaining critical food items. The panel feels that there are not adequate stockpiles of food currently available. It must be kept in mind that large reserves of cereal grains have been depleted over the past few years. Concurrently, the food industry, because of technological advances and better distribution methods, tend to maintain lower inventories. As a result, there is serious doubt that food supplies available in a post attack situation would be adequate for the majority of the survivors.

Recommendation. The panel recommends that the federal government explore ways in which medical civil defense training might be made available to all secondary school students, perhaps in

conjunction with current programs on physical fitness. It further recommends that the status of food supplies available in a post attack situation be reviewed carefully.